WILDLIFE REVIEW

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Washington, D. C. No. 10 October, 1937

Classification: Clapper rails

Oberholser, Harry C. A revision of the clapper rails (Rallus longirostris Boddaert), Proc. U. S. National Museum (Smithsonian Institution, Washington, D. C.), 84(3018), pp. 313-354, 1937.

Scientific and English names, citation of place of original description, subspecific characters, measurements, type locality, geographic distribution, and remarks, for 25 races of clapper rails of which 8 occur in the United States. No key.

Conservation: Birds in California

Linsdale, Jean M. Preservation of birds in California, The Condor (W. Lee Chambers, 2068 Escarpa Drive, Eagle Rock, Los Angeles, Calif., 50 cents a copy), 39(5), Sept.-Oct. 1937, pp. 198-203.

An attempt to appraise some of the important influences that affect the preservation of birds in California. The sage grouse is in danger of extirpation chiefly due to devastation of its environment by grazing. The filling in of marshes is doing away with the clapper rail and its associates. The author thinks that shorebirds, ducks, and geese are better off than they were 8 years ago. The California condor is in imminent danger of extinction and several of the rarer birds of prey have too many adverse factors to contend with.

The acreage devoted to agriculture is about the same as it was 50 years ago and there is little need to provide habitat for birds evicted by farming. About half of the area of the State is neither farms nor forests and conditions affecting bird life on it have changed but little. Additional refuges are not needed so much as proper administration of those now in existence.

Bird collectors are few and probably do not seriously affect the avifauna except in a few instances through the collecting of eggs of threatened species for exchange.

In connection with bird control measures the writer says these grew out of mammal control operations, implies that those in charge of bird control work have been active in attempts to forestall a recurrence of the obstacles which impede efforts to kill mammals, and asserts that it is practically impossible to fix the amount of damage done to crops by birds. [Comment by abstracter: In another place in this issue of WILDLIFE REVIEW (Life Histories: Magpies) the same author has been credited with writing objectively, but that remark cannot be extended to the present paper. It is in places very subjective and reminiscent of a highly debatable article published by him some years ago. With reference to the allegations cited in the earlier part of this paragraph, it must be said that control of birds injurious to agriculture preceded that of mammals of the same category in Californian, just as it did in National, history. Bird control by officials in California has been done in a moderate way, corresponding to needs, and certainly without secrecy. Bird damage to

crops often can be very definitely fixed and when it results in total or nearly total destruction, its appraisal may very well include all costs that have been incurred in protecting the crop from other enemies up to the time of its devastation by birds. There is in such instances not a division of losses among various agents but a compounded responsibility of the final depredator for destruction of a perfected and costly product.]

The author suggests that expansion in the field of wildlife management may have been too rapid to be stable, which may be true, but his comparison of wildlife management with that of domesticated animals and his suggestion that it may benefit a few species and be inimical to plants and animals in general, are wide of the mark. Wildlife management is in no wise domestication; it is essentially environmental improvement and in most cases will surely benefit many species besides those for which it was primarily undertaken. The author is of the further opinion that bird protection is losing ground, the attitude of the people swinging to one of indifference or actual disfavor. If this is true in California, it means that the State has not shared equitably in a cultural phenomenon very evident in general, namely, that the sentiment for protection of birds for esthetic reasons has been steadily growing for a long time.

Conservation: History in Wisconsin

Scott, Walter E. Conservation history, Wisconsin Conservation Bul. Wisconsin Conservation Department, Madison, Wis.), 2(6), June 1937, pp. 27-37.

Continuation of the chronological account of the State's activities in conservation, earlier installments of which were noted in WILDLIFE REVIEW, No. 9, July 1937, p. 3.

Conservation: Nature preserves

Salgues, R. Protection de la Nature et Reserves floro-faunistiques [Nature protection and floro-faunal reserves], Revue generale des Sciences (8 Place de l'Odeon, Paris, 6e, France, 5 francs a copy), 47(9), May 15, 1936, pp. 276-280; 47(10), May 31, 1936, pp. 305-312; 47(12), June 30, 1936, pp. 376-380; 47(13), July 15, 1936, pp. 394-403.

Review of National Park programs of the United States and Canada, with notes on the principal areas and their attractions including mammals and birds, and also on their administration and use by the public. Briefer reference is made to similar reservations in Argentina, Brazil, Australia, Japan, Dutch East Indies, British India, Madagascar, Africa, and in several European countries. Description is given of a number of areas in France, preservation of which by the nation is urged. Advantages of nature reserves include; the possibility of complete identification of the biota of an area; diminution of erosion and maintenance of normal stream flow; flood control; conservation of topographic and geological features, and of the flora and fauna; and increase of game by overflow into the surrounding territory. Suggestions are given on the selection of areas and upon their administration after reservation.

Conservation: The waterfowl situation

Anon. Hearing before the Select Committee on Conservation of Wildlife Resources, House of Representatives (House Office Bldg., Washington, D. C.), 75th Congress, 1st session, 60 pp., 3 maps, 1 graph, 1 table, June 1937.

Statements on the water fowl situation by Ira N. Gabrielson and Frederick C. Lincoln of the Biological Survey, Henry P. Davis of the American Wildlife Institute, John C. Huntington of More Game Birds in America, Inc., and Carl D. Shoemaker, Secretary of the Senate Special Committee on Conservation of Wildlife Resources. Mr. Lincoln's presentation included BS-Leaflet No. 88 (abstracted in WILDLIFE REVIEW, No. 9, July 1937, p. 36); reprinting of this leaflet accounts for the maps, etc., noted above. A section of the report is devoted to letters on the waterfowl program and shooting regulations from State Game Departments. Out of a total of 24 of these, 14 express a desire for increased shooting privileges.

Control: Bounties in Pennsylvania

Gordon, Seth. Bounty resolution explained, Pennsylvania Game News (Board of Game Commissioners, Harrisburg, Pa., 10 cents a copy), 8(5), Aug. 1937, p. 32.

Brief history of bounty payment in the State and reasons for a change in policy. The wildcat bounty is abolished; that on gray fox continued at $4.00; that on the weasel reduced from $1.00 to 50 cents; that on goshawk reduced from $5.00 to $2.00 on adults, a payment of $1.00 to be made for fledglings, all birds to be killed between November 1 and May 31; and new bounties in these same amounts and for the same season placed on the great horned owl.

Control: Mice in Switzerland

Riis, Paul B. Chemical poisoning of rodents dangerous, Parks and Recreation (Rockford, Ill., 25 cents a copy), 20(12), August 1937, pp. 599-602.

Birds of prey attendant on a mouse plague in Switzerland allegedly killed by secondary poisoning. Campaign condemned for this reason and for ineffectiveness. Recommendations made to canton officials that permits to poison be withdrawn, and all raptors protected. Control of mice in other parts of the country under the personal direction of a qualified technician had better results. Specific mouse serum was used, thus not endangering the lives of predators.

Control: Range rodents

McCampbell, Sam C. Improve your range by rodent control, Colorado State College Extension Service (Fort Collins, Colo.) Circ. 121-A, 8 pp., illus., May 1937.

Instructions for combating prairie dogs, ground squirrels, and pocket gophers.

Cycles

Keen, F. P. Climatic cycles in eastern Oregon as indicated by tree rings, Monthly Weather Review (Supt. of Documents, Washington, D. C., 15 cents a copy), 65(5), May 1937, pp. 175-188, 8 figs., 3 tables.

A masterly discussion with bibliography of 12 titles. Perhaps the most significant sentence for students of cycles is: "As far as can be determined at the present time, there is nothing to indicate that the apparent cycles of growth are anything more than chance variations."

Destruction: Woodland caribou

Cox, W. T. Last stand of woodland caribou, Outdoor America (1167 Merchandise Mart, Chicago, Ill., 10 cents a copy), 2(6-7), May-June 1937, pp. 4-5, 16, 3 photos.

From thousands, the number of caribou in Minnesota has dwindled to 6 at the last count. Slaughter in earlier days, and forest fires and drainage in later times, have been prime factors in the destruction. Drainage ditches trapped the animals, and draining made calving ranges more accessible to wolves which could then readily find the calves. The woodland caribou has also been seriously depleted in Canada, but it now appears likely that some Canadian animals may be obtained for incorporation with the Minnesota remnant in an attempt to perpetuate the species in an environment that is being restored so far as practicable.

Diseases and Parasites: Cestodes of English sparrow

Stunkard, H. W., and John J. Milford. Notes on the cestodes of North American sparrows, Zoologica (New York Zoological Society, New York, N. Y.), 22(2), No. 11, July 16, 1937, pp. 177-183.

Cestodes recorded from Passer domesticus throughout its range; nomenclatorial history of the parasites; synonymy of 2 species reported as occurring in North America; description of Choanotaenia passerina from sparrows collected in Alabama; bibliography of 19 titles.

Diseases and Parasites: Foot-and-mouth, wild animals in relation to

Elton, Charles. Report on faunal surveys of foot-and-mouth areas, in 1934-5, Fifth Progress Rep. Foot-and-Mouth Disease Research Comm. (Ministry of Agriculture and Fisheries, London, England), 1937, Appendix V, pp. 379-386, 1 table.

Essentially a survey as to presence and abundance of wild mammals in infected areas; the evidence as to actual connection of those animals with maintenance and transmission of the disease is negative.

Diseases and Parasites: Fur animal

Shillinger, J. E. Diseases of fur animals, U. S. Dept. Agr. Farmers' Bul. (Supt. of Documents, Washington, D. C., 5 cents a copy) 1777, 22 pp., 7 figs., July 1937 (August).

General instructions for sanitary construction and care of equipment, and management of the animals. The infectious diseases discussed are distemper, paratyphoid, encephalitis, enteritis, and pneumonia. Internal parasites dealt with include ascarids, hookworms, lungworms, bladderworms, tapeworms, flukes, and coccidia. External parasites commented upon are fleas, lice, and mange mites. Maladies traceable to faults in food and water such as rickets, urinary calculi, food poisoning, and digestive irregularities are given attention, as are also injuries, wounds, and vices. Wherever practicable, suggestions for prevention and treatment are offered.

Diseases and Parasites: Game bird, simple treatments

Anon. Disease: Some simple treatments, I. C. I. Game Researches (Imperial Chemical Industries, Ltd., Millbank, London, England) Advisory Leaflet 12, June 1937, 10 pp.

Not a technical treatise but simple suggestions for the game breeder as to treatment and prevention of gapes, coccidiosis, cramp, pneumonia, sore-mouth, and strongylosis.

Diseases and Parasites: Kingfisher trematodes

Harwood, Paul D. Notes on Tennessee helminths III. Two trematodes from a kingfisher, Journ. Tenn. Acad. Sci. (Dr. J. T. McGill, Vanderbilt University, Nashville, Tenn., 50 cents a copy), 11(4), Oct. 1936, pp. 251-256, 1 fig.

Key to 4 species of the genus Cathemasia and 5 of Crassiphiala with detailed description of one species in each genus from the host mentioned. Bibliography of 11 titles.

Diseases and Parasites: Muskrat in Great Britain

Warwick, Tom. The occurrence of a disease among muskrats (Ondatra zibethica) in Great Britain during 1934, Journ. Animal Ecology (Cambridge University Press, Fetter Lane, London, E.C. 4, England), 6(1), May 1937, pp. 112-114.

A campaign of trapping by the Ministry of Agriculture and Fisheries brought about great decrease in the numbers of muskrats, but concurrently it appears that there was some natural disease which intensified the downward trend. The lesions in specimens autopsied were of the liver due to roundworms (Capillaria hepatica) of the lungs caused by a haemolytic streptococcus, and of the spleen due to tuberculosis.

Diseases and Parasites: Nematode classification

Dikmans, Gerard. A note on the members of the nematode genus Trichostrongylus occurring in rodents and lagomorphs, with descriptions of two new species, Journ. Wash. Acad. Sci. (350 Ahnaip St., Menasha, Wis., 50 cents a copy), 27(5), May 15, 1937, pp. 203-209, 2 figs.

List of the species of Trichostrongylus recorded from hosts of the groups named; descriptions and illustrations of 2 new American species; key to the group of 7 species; and bibliography of 6 titles.

Diseases and Parasites: Nematode of pigeon

Cuvillier, Eugenia. The nematode, Ornithostrongylus quadriradiatus, a parasite of the domesticated pigeon, U. S. Dept. Agr. Tech. Bul. (Supt. of Documents, Washington, D. C., 10 cents a copy) 569, 36 pp., 6 figs., June 1937 (July).

Of interest to wildlife technicians because the "domesticated" pigeon exists also as a self-maintaining unit of the American avifauna and may share its parasites with any susceptible native species. The present treatment is thorough, giving epizootic and taxonomic history of the nematode, its life history, host-parasite relations, pathogenicity, and control measures. Bibliography of 40 titles.

Diseases and Parasites: Quail malaria

Herms, W. B., and C. G. Kadner. The louse fly, Lynchia fusca, a parasite of the owl, Bubo virginianus pacificus, a new vector of malaria of the California valley quail, Journ. Parasitology (Lime and Green Sts., Lancaster, Pa.), 23(3), June 1937, pp. 296-297.

Experimental proof that this fly can transmit Haemoproteus lophortyx, the cause of quail malaria.

Diseases and Parasites: Snowshoe hare, et al

Green, R. G., and associates. Minnesota Wildlife Disease Investigations (Dept. of Bacteriology, University of Minnesota, Minneapolis), January-June 1937, 6 issues comprising pp. 58-106, Tables 28-55.

These reports on cooperative work between the Department of Bacteriology University of Minnesota, the Division of Game and Fish, Minnesota Department of Conservation, and the Division of Wildlife Research, U. S. Biological Survey, after an interruption, are being issued by the University under the general authorship of Dr. R. G. Green of that institution, J. F. Bell, Minnesota Department of Conservation and Bureau of Biological Survey, Dr. C. A. Evans, C. L. Larson, and C. H. Drake of the Survey, and D. W. Mather on special assignment from the U. S. Forest Service.

The reports are largely on studies of snowshoe hares from the Lake Alexander area, including the results of necropsies, biochemical studies, tularemia immunity tests, and parasite investigations. There are brief accounts of shock disease in the January and February reports when this malady was declining; on quail disease and fox distemper inclusions in the March issue; on further results of the experimental work on non-toxic shot in the April and May reports; on chastek paralysis in foxes due to fish diet deficient in Vitamin B in the April number; and on a case of chronic poisoning mistaken for an infectious disease of quail in the June issue.

Diseases and Parasites: Strongylus

Harwood, Paul D. Notes on Tennessee helminths II. Two new species of Strongylus (Nematoda) and notes on the genus, Journ. Tenn. Acad. Sci. (Dr. J. T. McGill, Vanderbilt University, Nashville, Tenn., 50 cents a copy), 10(2), April 1935, pp. 131-141, 1 pl.

Key to 13 species of which 3 are described as new, one from the American rail fence lizard (Sceloporus undulatus). Bibliography of 11 titles.

Diseases and Parasites: Trematode classification

McMullen, Donald B. A discussion of the taxonomy of the family Plagiorchidae Luhe 1901, and related trematodes, Journ. Parasitology (Lime and Green Sts., Lancaster, Pa.), 23(3), June 1937, pp. 244-258, 1 pl.

History of classification of the group; tabulation of known life histories, showing the hosts--a variety of amphibians, reptiles, birds, and mammals; diagrams of structure of the genera; diagnoses of this and related families, 2 new; bibliography of 48 titles.

Diseases and Parasites: Trematode life histories

McMullen, Donald B. The life histories of three trematodes, parasitic in birds and mammals, belonging to the genus Plagiorchis, Journ. Parasitology (Lime and Green Sts., Lancaster, Pa.), 23(3), June 1937, pp. 235-243, 1 pl.

Natural infections were found in nighthawk, robin, herring gull, and spotted sandpiper; they are known also in bats and the muskrat; intermediate hosts snails and aquatic insects; bibliography of 7 titles.

Diseases and Parasites: Tuberculosis in wild voles

Wells, A. Q. Tuberculosis in wild voles, The Lancet (7 Adam Street, Adelphi, London, W.C. 2, England, 1 shilling a copy), 232(5934), May 22, 1937, p. 1221.

Author's summary: "The presence of disease, presumed to be tuberculosis, in wild voles is reported. The fact that the disease is widespread in the British Isles suggests that this is not a chance infection."

Diseases and Parasites: Upland game bird

Shillinger, J. E., and L. C. Morley. Diseases of upland game birds, U. S. Dept. Agr. Farmers' Bul. (Supt. of Documents, Washington, D. C., 5 cents a copy) 1781, 33 pp., 8 figs., August 1937 (September).

The general discussion pertains to losses among wild game birds from disease and the possibilities of preventing them, and sanitation of game farms including construction, disinfection, and quarantine. The diseases are treated in groups as those due to bacteria and filterable viruses (10), to fungi (2), internal and external parasites (12), to nutritional causes (5). Ant attack, cannibalism, and poisoning also are discussed. So far as possible the accounts deal with the cause and spread, symptoms and post-mortem appearance, and prevention and control of each malady.

Ecology: Census of California sea lions

Bonnot, Paul. California sea lion census for 1936, California Fish and Game (450 McAllister St., San Francisco, Calif.), 23(2), April 1937, pp. 108-112, 1 photo, 3 tables.

Brief discussion of economic status of sea lions and factors in their destruction. Inimical pressure has lessened in recent years; nevertheless the total number of Steller's sea lions for the State is given as 4,900 contrasted to 6,148 for 1927. On the other hand, the California sea lion has increased in that period from 915 to 2,501.

Ecology: Census methods

Lack, David. A review of bird census work and bird population problems, The Ibis (Taylor & Francis Ltd., Fleet St., London, E.C. 4, England, 12 shillings 6 pence a copy), Ser. 14, 1(2), April 1937, pp. 369-395.

Citing 165 references on his subject, many of them summaries in themselves, the writer digests their contents and discusses their implications. The section on The Species Census is an historical index; that on Regional Censuses cites density of population per 100 acres for 28 of them classed in ecological groups. Methods of census taking are discussed and the statement made that "For regional breeding censuses the only reliable method is to locate every breeding pair." Fecundity and mortality studies should be intensified. Of factors affecting bird populations, activities of man, variations in habitat, fluctuations, food, predators, disease, fecundity, behavior, and territorial requirements are discussed.

Ecology: Crow-waterfowl relationships

Kalmbach, E. R. Crow-waterfowl relationships, U. S. Dept. Agr. Circular (Supt. of Documents, Washington, D. C., 10 cents a copy) 433, 35 pp., 3 pls., 15 figs., 6 tables, June 1937 (July).

Report on two-years' investigations in Saskatchewan and Alberta. The areas studied and the methods of investigation are described. The occurrence and abundance of crows on waterfowl breeding ranges is discussed and maps given illustrating the relation of crow range to those of 14 of the more important species of wild fowl. The number of nests studied during the 2 years' field work was 601, of which the complete histories of 512 were recorded. About half of the nests produced young. Crows were charged with destruction of 31 percent of the nests. These and other losses are discussed as a whole and by species, and also in relation to time of occurrence, degree of concealment of the nests, and their local environment. There is an account of the food of crows as revealed by analyses of the stomach contents of 25 adults and 43 nestlings, and comparison of the results with those reached in a general study of crow food in the United States. The availability of duck eggs is reflected in a fourfold increase in the case of adults and a sixfold increase in that of nestlings over egg-consumption figures for the United States. No pronounced mortality of ducklings was found attributable either to crows or other predators. Remedial measures are discussed and emphasis placed on restriction of their application to properly qualified persons.

Ecology: Overpopulation of deer on winter range

Gerstell, Richard. Winter deer losses, Pennsylvania Game News (Board of Game Commissioners, Harrisburg, Pa., 10 cents a copy), 8(7), Oct. 1937, pp. 18-21, 29, 14 figs. (11 photos, 3 graphs), tables.

During other seasons the deer are well distributed over available range but in late fall and early winter they congregate and in severe weather seek and remain in stream bottoms. In an area studied, the well distributed late December population had a density of one deer to 14.5 acres, but by the middle of February the same population concentrated by severe weather conditions was a deer to each 1.5 acres. Such a herd appears weather-bound and the animals rapidly lose condition. Food depreciates in quality as well as quantity and the animals not only become emaciated but lose resistance to pneumonia and parasites. Of 3,240 winter-killed deer, 89 percent were fawns, 8 percent yearlings, and 3 percent adults. In experimental feeding it was found that under similar temperature conditions the weight of animals having an excess of food always available varied according to the quality of the diet. Below 40° F. the weight curve of young animals on anything other than ideal food tended to follow the temperature curve.

Economics: Value of muskrats

Bailey, Vernon. The Maryland muskrat marshes, Journ. Mammalogy (Wm. H. Burt, University Museum, Ann Arbor, Mich., $1.00 a copy), 18(3), Aug. 1937, pp. 350-354, 4 photos.

Among natural resources of Maryland muskrats, as an exception, are holding their own due to management. The annual catch is about one million and the best present price per skin $2.00. Good muskrat marshes are as valuable as farm land. Brief notes on humane traps and on habits of the animals. Use of muskrats as food; present price 10 cents a pound for rough-dressed carcasses.

Education: Conservation in public schools, Texas

Stillwell, Jerry E. Conservation and nature study in the Dallas Public Schools (Obtainable from the author, 7460 San Benito Way, Dallas, Texas), 23 pp. (95 x 222 mm.), August 1937.

Arguments for the teaching of conservation including numerous quotations from notables with references. A bibliography includes not only these citations but also the titles and place of publication of general works on the teaching of conservation, recent books on conservation, and texts and other works likely to be of value in connection with its teaching.

Education: Conservation in public schools, Wisconsin

Waddell, J. F., Chairman, Teaching Conservation in Wisconsin Schools, Curriculum Bulletin (Dept. of Public Instruction, Madison, Wis.) 1(1), May 1937, 71 pp., illus.

Reasons for conservation instruction; when and how it should be taught; objectives; what does conservation involve? There are chapters on conservation of the soil, of water, mineral, and scenic and historic, resources, and of forests, wild vegetation, and wildlife, each including teaching suggestions and a bibliography. Appendices give the biography of a quail covey, an outline for wildlife teaching, suggestions as to the preservation of native plants, and a chronology of events in Wisconsin wildlife conservation.

Food Habits: American merganser

Munro, J. A., and W. A. Clemens. The American merganser in British Columbia and its relation to the fish population, Biological Board of Canada (Ottawa), Bul. 55, 50 pp., 10 figs., 5 tables, Sept. 1937.

Summary of investigations, several units of which have previously been reported upon. The life history of the bird is discussed in its bearing on the economics of the species; territorial requirements are touched upon in a section on population studies, and there is a brief statement about restrictive factors. For a study of the food habits 363 "stomachs" were available. Aids to identification of the fish food items are discussed and illustrated. The authors took the unusual but praiseworthy course of studying the food habits of the fishes preyed upon as a guide to appraisal of economic values, and report upon those of 10 species. The findings regarding the merganser and the fishes are presented both by localities and in summary. The outstanding foods of the fish duck are freshwater sculpins, salmon eggs, Salmonidae (char, trout, salmon), and sticklebacks. A great many of the eggs consumed are waste and were evidently dead when eaten. Considering all aspects of the problem in the light of their very thorough investigation, the authors conclude "that the American merganser does not affect adversely the production of trout and salmon to an appreciable degree, because its numbers are not excessive and its food consists to a very large degree of coarse and undesirable fishes." This conclusion does not preclude the idea that control may be locally desirable but

control efforts should be undertaken only where proper biological investigation shows them to be warranted. "When special measures of control are necessary they should be regarded as a corrective for a temporary abnormal condition and not as a permanent policy. In such special habitats as rearing ponds, or where fish cultural activities are concentrated, there always may be a need for continued control. A general reduction of American mergansers on the assumption that at some time or in some place they may cause losses of trout or salmon is considered an unsound and unwarranted procedure."

Food Habits: Bird damage to almonds

Emlen, J. T., Jr. Bird damage to almonds in California, The Condor (W. Leo Chambers, 2068 Escarpa Drive, Eagle Rock, Los Angeles, Calif., 50 cents a copy), 39(5), Sept.-Oct. 1937, pp. 192-197, Figs. 55-57, 2 tables.

Review of previous papers on the subject. Report on study of damage on the University Farm at Davis. The birds chiefly involved were the western crow, California woodpecker, California jay, and red-shafted flicker. At the height of the season the consumption of almonds by birds was over 1,000 a day. The severity of attack upon varieties was about in proportion to the thin-ness of shell. Damage in various orchards varied from 5 to 25 percent which in commercial orchards would be enough to cancel profits. "Fortunately, in the large commercial orchards losses as high as this appear to be exceptional."

Food Habits: Fur seal

Clemens, W. A., J. L. Hart, and G. V. Wilby. Analysis of stomach contents of fur seals taken off the west coast of Vancouver Island in April and May 1935, Dept. of Fisheries (Ottawa, Canada), 20 pp., 3 tables, 1936.

This report of the Canadian Pacific Biological Station is based on examination of 193 stomachs containing food. The distribution of all stomachs collected according to date, size and sex of the seals, amount of food contained, and the sealing area is given in one table, and a list of the food organisms identified in stomachs according to day of capture together with total volumetric percentages and frequency of occurrence of the food items in another. Herring composed 84 percent of the food. The consumption of very considerable amounts of commercial fishes is indicated but further investigation should be undertaken. Bibliography of 4 titles of reports on food habits of the same species.

Food Habits: Hawks

Luttringer, Leo A. Hawks--What they eat, Pennsylvania Game News (Board of Game Commissioners, Harrisburg, Pa., 10 cents a copy), 8(6), Sept. 1937, pp. 8-9, 3 photos.

Summary of the results of analyses of 347 stomachs of 7 species, chiefly goshawks. The author considers most hawks beneficial, but defends bounty payments that do not threaten extermination of species.

Food Habits: Red fox

Hamilton, W. J., Jr., N. W. Hosley, and A. E. MacGregor. Late summer and early fall foods of the red fox in central Massachusetts, Journ. Mammalogy (Wm. H. Burt, University Museum, Ann Arbor, Mich., $1.00 a copy), 18(3), Aug. 1937, pp. 366-367, 2 tables.

Brief description Harvard Forest, Mass., where the scats analyzed were collected. In 131 representing the period mid-August to early October, cherries occurred 71 times, insects 69, blackberries 45, blueberries 19, cottontails 15, and field mice 12; the frequencies of less important foods also are given. In 36 scats collected in late November, fruits occurred in 20 and mammals in 18. The fruits in the order of their frequency were apples, cherries, grapes, and sarsaparilla and service berries. The mammals were chiefly field mice and cottontails.

Food Habits: Wood rat damage to redwood transplants

Porson, Hubert L. Commercial planting on redwood cut-over lands, U. S. Dept. Agr. Circular (Supt. of Documents, Washington, D. C., 10 cents a copy) 434, 39 pp., 15 figs., 16 tables, July 1937.

Wood rats are important among factors limiting survival of planted redwoods in northwestern California. Rodent destruction in which they are chiefly responsible sometimes involves from 35 to 50 percent of the transplants.

Life Histories: Fur animals of California

Grinnell, Joseph, Joseph S. Dixon, and Jean M. Linsdale. Fur-bearing mammals of California, their natural history, and relations to man, University of California Press (Berkeley, Calif., $15.00 per set of 2 volumes) I, xii + 1-375 pp., col. pls. 1-7, figs. 1-138; II, xiv + 377-777 pp., col. pls. 8-13, figs. 139-345.

This is a natural history of the fur animals of California, based as largely as possible on intrastate data. The manuscript was submitted for publication in 1933, hence is not strictly up-to-date. The work deals with 68 species and subspecies of mammals, mostly carnivores and rodents. Technical information, while condensed, is presented with the accuracy and detail demanded by the systematist. A point is made of citing both scientific and vernacular names in addition to those adopted as standard. The natural history of the species consists of observations of the authors, testimony of trustworthy observers, and usually to a considerably less extent of quotations from the literature. Special attention is given to the presentation of accurate weights. Food habits are treated as definitely and fully as possible. The value of the fur, the status of the species in the California fur trade, and a summary of the animal's relations to man from all points of view are included in each account. The work is well illustrated and the colored plates by Allan Brooks afford most readers a better idea of the appearance in natural surroundings of the animals portrayed than they are ever likely to gain from personal experience.

General discussions relate to the history of fur trapping in California, present-day trapping, effects of fur mammals upon man, and of man upon these animals, population trends in the fur-bearers of California, and fur farming in the State. The fur trade in California, as in most of the United States and Canada, was an important factor in early history; organized collection of furs in California began in 1786. In the chapter on present-day trapping, statistics compiled from reports of licensed trappers are given on the number of animals caught, average prices, number of trapping licenses issued, percent of trappers reporting, and value of furs by species, from 1920 to 1924. The largest class of trappers is believed to be schoolboys and being under age are not required to have licenses or report their catches. The discussions of economic values have a conservation trend. The subject is complex and the authors conclude that "Persons who appear to have solved the problem have usually arrived at conclusions without the aid of facts sufficient to reveal the true nature of the situation. There has been a widespread increase in the alarming practice among some wild-life administrators of instituting regulations which actually cause more serious conditions than those that they are trying to remedy" (p. 19). Prejudice against animals in general and especially against the large ones which appear to compete with man is an important element in governing public policy and is something that can be overcome only gradually and by education--to which process these volumes are a distinguished contribution.

In the chapter on population trends, 17 factors deemed responsible for a general decrease in California fur-bearers are discussed. The authors believe that poison put out for squirrels is the chief cause, both directly and indirectly, of depletion of the fur-animal populations in many localities, especially in the southern half of the State. The account of fur-farming is by no means optimistic, much less so than could with justice be written for various American States and Canadian Provinces in the general region of the Great Lakes.

The work is well done and the two handsome volumes will grace the shelves of any naturalist as well as serve indefinitely as the most valuable source of reliable information upon the fur animals of California.

Life Histories: Magpies

Linsdale, Jean M. The natural history of magpies, Cooper Ornithological Club, Pacific Coast Avifauna 25 (2068 Escarpa Drive, Eagle Rock, Los Angeles, Calif., $3.50 in paper covers, $4.25 cloth bound, a copy), 234 pp., 8 pls. (1 col.), 20 figs., tables, Aug. 1937.

Synthesis of a very detailed compilation of all kinds of information about magpies of the world with especial emphasis on the American forms on which the author has done considerable field work. Taxonomy, distribution, habitat relations, food and feeding habits, migration, nesting territory and courtship, nests, eggs and incubation, history of the young, anatomy, plumages and molts, general habits, populations, relations to other animals and to man are the principal groupings under which the material is arranged. A list of 422 vernacular names from numerous languages and more than 20 pages of bibli-

ography testify to the thoroughness with which the literature was examined. On account of limited power of flight magpies are closely bound to adequate cover; in general they are little migratory; they do not manifest strong "territorial" monopolization; mating apparently is for life; about three-fourths of the food is animal, including birds' eggs and nestlings, and flesh torn from living large mammals, besides items of opposed economic classification. The treatment is objective, facts being advanced or quoted without rationalization.

Life Histories: Muskrat breeding

Errington, Paul L. The breeding season of the muskrat in northwest Iowa, Journ. Mammalogy (Wm. H. Burt, University Museum, Ann Arbor, Mich., $1.00 a copy), 18(3), Aug. 1937, pp. 333-337, 2 tables.

Bulk of births in May, June, and July; two litters per female the usual number, three not infrequent; young do not breed in year of birth; gestation period apparently variable, possibly from 19 to 30 days.

Life Histories: Oven-bird

Hann, Harry W. Life history of the oven-bird in southern Michigan, Wilson Bulletin (Dr. T. C. Stephens, Morningside College, Sioux City, Iowa, 60 cents a copy), 39(3), Sept. 1937, pp. 145-237, 11 pls., 5 tables.

A report based on 2 full and 2 partial seasons of field work of modern type; it is one of the best of published life histories and doubtless the best for any species of American warbler. The text is arranged under the following main headings: Territorial and sexual relations, singing, nest, eggs, nestlings, fledglings, departure, reproduction and survival, and the cowbird in relation to the oven-bird. The last cited section is presented in considerable detail and it shows the cowbird to be responsible for the loss of 18 percent of the total number of eggs, chiefly by direct removal. Nevertheless the oven-bird is not considered a very favorable host for the cowbird.

The paper contains findings that should give theorists pause such as that "choice of mates appears to be only a matter of chance," "there is some contention and fighting between males, but no injury was ever noted as a result," "Copulation between non-mated birds is common," and "Parents continue to swallow the fecal sacs to some extent as long as the young are in the nest." The first three of these findings cast an unfavorable light on the hypothesis of sexual selection, and the last on that of protective adaptations under which certain caterpillars and spiders are supposed to gain advantage by resemblance to bird droppings.

Life Histories: Sage grouse

Girard, George L. Life history, habits, and food of the sage grouse, Univ. Wyoming Publ. in Science (University of Wyoming Press, Laramie, Wyo.), 3(1), pp. 1-56, 5 pls., 12 tables, Sept. 1937.

Despite the limited period of intensive field work he enjoyed, the writer has been enabled by his general knowledge of the species, and by ingenuity and diligence to bring together in this paper a surprising amount of detailed information on the sage grouse. Descriptive notes and measurements are original, and the statement of range, although necessarily compiled in part, contains up-to-date local data by the writer. About half of the vernacular names cited are here first recorded, but through some slip 7 of the older names from the literature are given as in present usage.

So condensed is the account of courtship, nesting, and component or related phenomena that abstracting is scarcely feasible. Migrations, molts, growth, general habits, social life, and their elements also are concisely treated. Food is described and tabulated in as much detail as warranted by Biological Survey analyses of the contents of 33 stomachs and crops collected in July and August in a single county. True to what is generally believed more than seven-tenths of the food consisted of composite plants, mainly Artemisia or sage-brushes and allies. The effects of predators, poison campaigns, and grazing on the birds are discussed as well as the outlook for conservation of the bird in Wyoming, including a suggested plan for management. The findings and conclusions are summarized, and although the paper surpasses, in the amount of original data, all that has previously been published on the sage grouse, the author regards it as only a basis for continued investigation.

Life Histories: Snowshoe rabbit sex ratio

Webb, William L. Notes on the sex ratio of the snowshoe rabbit, Journ. Mammalogy (Wm. H. Burt, University Museum, Ann Arbor, Mich., $1.00 a copy), 18(3), Aug. 1937, pp. 343-347, 1 fig., 1 table.

Economic tendencies: negative as destructive to tree plantings; positive as a game and buffer species, and as material for the study of cyclic decimations. The sex ratio in 3,920 rabbits trapped during a period of 5 years is shown in table and graph by months and years. The percentage of males varied from 45.7 to 55.5 in the lows and highs corresponding to those of the cycle.

Life Histories: Speed of mammals

Biddle, Nicholas. The speed of mammals, Pennsylvania Game News (Board of Game Commissioners, Harrisburg, Pa., 10 cents a copy), 8(5), Aug. 1937, p. 19.

General discussion and speedometer records showing the best rate per mile of the pronghorn antelope 43 m.p.h.; race horse 36; greyhound 30; jack rabbit 28; red fox 26; coyote 24; fox hound 22; and gray wolf 20.

Management: Dust and grit requirements

Anon. Grit and dust, I. C. I. Game Researches (Imperial Chemical Industries, Ltd., Millbank, London, England) Advisory Leaflet 3, 8 pp., table, 2 pls., August 1937.

This replaces the original No. 3, abstracted in WILDLIFE REVIEW, No. 3, April 1936, p. 26, and as stated on the cover has been completely revised. Section headings indicating the contents are: Grits found in partridges and soils, the right kind of grit, buying grit, dusting shelters, and gritting and dusting stations. The plates illustrate typical grits used by 6 kinds of game birds and a dusting shelter.

Management: Farmer-sportsman relationship

Anon. More farm game cooperative programs, Izaak Walton League of America (Merchandise Mart, Chicago, Ill.), 6 pp., mimeographed, March 1937.

Value of farmer-hunter cooperation; landowner organizations; notes on plans tried in Ohio, Michigan, and Iowa; the sportsman's part; where aid can be obtained. References to 8 pertinent publications. Sample signs suitable for use on cooperative hunting areas.

Management: Farmer-sportsman relationship

Conklin, W. Gard. Status of the farm game refuge program, Pennsylvania Game News (Board of Game Commissioners, Harrisburg, Pa., 10 cents a copy), 8(7), Oct. 1937, pp. 6-10, 4 photos, 2 maps, 1 table.

History of the program; statistics on number of projects (19), their location, number of farms involved (288), and acreage (21,982); the movement definitely under way only since 1936 is said to be developing nicely. Details are given as to acreage of safety zones in 8 of the projects. Flushing bars were furnished to 12 cooperators who report the saving of numerous nests by their use. Food patches and woody cover and food plants were set out to improve conditions on the farms. Farmers are not paid in cash but are recompensed in incidental ways, which are enumerated.

Management: Farmer-sportsman relationship

East, Ben. Can we save free hunting?, Outdoor Life (Popular Science Publishing Co., Dayton, Ohio, 15 cents a copy), August 1937, pp. 13-15, 56, illus.

Viewpoint of farmers said to demand protection from trespass abuses more than cash. Trial of leasing land by State Board of Fisheries and Game in Connecticut and its loss of popularity described. Description of this State's regulated public hunting plan under which the farmer grants hunting rights to the Board, the latter agreeing to enforce hunting regulations, plant game, and protect the farmers from vandalism; no money payments are involved. 120,000 acres are reported under this plan. New Jersey is buying and developing public shooting grounds but also has a cooperative plan much like that in Connecticut that applies to 129,000 acres. The New Jersey system provides for safety zones of from 400 to 600 feet radius about farm buildings.

Management: Feed patch planting in Michigan

Tubbs, F. F., and G. W. Bradt. The planting of food patches for wild life, Game Management Circular 1, Michigan Department of Conservation (Lansing, Mich.), 4 pp., 1 fig., 2 tables, all unnumbered, revised 1936.

Suggestions as to suitable strains of crop plants, preparation of soil and seedbed, rate of seeding. Comment on value of the various kinds as cover and food. Formula for the Williamston seed mixture. Brief hints as to valuable fruit-bearing shrubs.

Management: Flushing bar

Anon. How to save birds and their young, Izaak Walton League of America (Merchandise Mart, Chicago, Ill.), 2 pp., illus., mimeographed, 1937.

Description and sketches of this device to save birds, nests, and eggs from destruction by mowers.

Management: Harvesting seals

Colman, J. S. The present state of the Newfoundland seal fishery, Journ. Animal Ecology (Cambridge University Press, Fetter Lane, London, E.C. 4, England), 6(1), May 1937, pp. 145-159, 3 figs., 2 tables.

The Harp seal (Phoca groenlandica) and the Hood seal (Cystophora cristata) are involved but the former is by far the most important. History of the industry from about 1750 is reviewed and the methods of hunting described. The numbers of animals taken by the crews of schooners from 1815 to 1862, and of steam vessels from 1863 to 1936, are tabulated, analyzed, and graphed. The average value of the catch is around $300,000 per year. In the author's opinion the seal herds, at the present rate of kill, are not decreasing, but may be increasing slowly, though they are still far smaller than they were before 1850. The trends of the business should be carefully watched and if necessary controlled. [The only excuse for calling the business a "fishery" seems to be that it is carried on by fishermen.]

Management: Herd reduction, Pennsylvania deer

Gerstell, Richard. Why antlerless deer seasons are necessary, Pennsylvania Game News (Board of Game Commissioners, Harrisburg, Pa., 10 cents a copy), 8(6), Sept. 1937, pp. 4-5, 4 photos.

The much discussed Pennsylvania deer problem is largely a food supply problem. Following widespread lumbering leaving much brushland favorable for deer, second growth in the sapling and pole stages greatly reduced ground growth so essential to the deer. The result has been heavy overbrowsing, detrimental not only to the forest but to farms, to certain species of small game, and to the deer themselves. These animals are stunted in their general size and antler development and fewer of the does bear twin fawns than normally. Open seasons on antlerless deer are being tried as a means of reducing the herds in the hope that the starvation of the animals and depreciation of the range can be halted.

Management: Introduction of birch cock

Hofbauer, George. Birch cock or black grouse, Hunter-Trader-Trapper (372 S. Fourth St., Columbus, Ohio, 15 cents a copy), 75(2), Aug. 1937, pp. 19-20, 1 photo.

Lyrurus tetrix; description; habits, sporting value; history of attempted introductions from Phillips (U. S. Dept. Agr. Tech. Bul. 61, 1928); suggestions for further trial; the bird recommended as "the last word in wariness."

Management: Maintenance of a stock of partridges

Anon. Partridge stocks and mortalities, I. C. I. Game Researches (Imperial Chemical Industries, Ltd., Millbank, London, England) Advisory Leaflet 13, June 1937, 9 pp.

Digest of Middleton's papers on partridge populations (abstracted in WILDLIFE REVIEW, No. 1, Sept. 1935, p. 12; No. 3, April 1936, pp. 13 and 26; No. 8, April 1937, p. 11) for the benefit of proprietors and keepers of partridge ranges, especially as to estimating the numbers of birds prior to the shooting season and regulating the kill so that there will be enough survive winter losses to provide the number of breeders needed for the following season.

Management: Range

Dayton, Wm. A., et al. Range plant handbook, U. S. Dept. of Agriculture (Supt. of Documents, Washington, D. C., $2.50 a copy). Pages not consecutively numbered, probably about a thousand. 1937. Copiously illustrated with line drawings, photographs, and colored cuts.

Conventional bibliographic citation for this book is not readily given as it is merely the bound edition of a Handbook prepared for loose-leaf filing and for enlargement in the future. The plant accounts are grouped as of grasses, grasslike plants, range weeds, and browse, and each species or group of species has devoted to it what amounts to a separate leaflet; these rather than their pages are numbered, which may be 2, or more. Each plant treated as a species or as the representative of a group is figured in a good line drawing, photograph, or colored illustration on the same page with paragraphs descriptive of its structures. Accounts of the plants include standard scientific and vernacular names, local appellations, notes on the plants' range, abundance, ecology, and palatability for grazing animals, and often on utilization by wildlife, poisonous or medicinal qualities, and other interesting features or associations. The work is the fruition of a long-time compilation by many people (13 are given author status) and condenses into handy form an almost infinite amount of detail regarding range plants; it at once becomes a necessity to all having to work with these plants.

Management: Refuges, Federal

Anon. Wildlife and the land. A story of regeneration, Committee Print (Senate Special Committee on Conservation of Wildlife Resources Senate Office Bldg., Washington, D. C.), 75th Congress, 1st session, 90 pp., 16 figs., 5 tables, 1937.

An account of the waterfowl and big-game refuge program of the Biological Survey, with description of the refuges, notes on the wildlife frequenting them, and improvements that have been made since their acquisition.

Management: Squirrels in Texas

Goodrum, Phil D. Wise use of forested lands necessary for squirrel conservation in east Texas, Progress Report, Agr. Expt. Sta., Division of Wildlife Research (College Station, Texas), 459, 4 pp., 1 map, mimeographed, Aug. 1937.

Notes on a method of estimating numbers of squirrels. A density of 2 or more to the acre is considered good. Natural breeding schedule. Overshooting, unrestricted timber cutting, overgrazing, and drainage are the principal inimical factors (all traceable to man, be it observed). The ways in which they affect the animals are described. Recommendations are given for restoring and increasing the squirrel population.

Management: Statistics as an adjunct

Conner, Geraldine. Fish and game statistics, California Fish and Game (450 McAllister St., San Francisco, Calif.), 23(2), April 1937, pp. 113-118, 1 pl.

A building especially designed for the statistical branch is described and illustrated; it was occupied in January 1937. It is equipped with electrically operated tabulating machines. Types of statistics handled are described, including reports on the kill of deer kept since 1927, and on other game since 1935. The results are of great value to the Department of Natural Resources in combatting activities and proposed legislation dangerous to the wildlife of the State.

Management: Stocking upland game birds in California

Bade, August. Eleven years of progress at the California State Game Farms, Calif. Fish and Game (450 McAllister St., San Francisco, Calif.), 23(2), April 1937, pp. 98-107, 5 photos.

Combination of information from articles previously abstracted in WILDLIFE REVIEWS No. 4, June 1936, p. 18, and No. 9, July 1937, pp. 31-32.

Management: Watering and winter feeding

Anon. Winter feeding and watering, I. C. I. Game Researches (Imperial Chemical Industries, Millbank, London, England) Advisory Leaflet 14, 12 pp., Aug. 1937.

This leaflet contains a revision of information presented in the original edition of Leaflet No. 3 (see a preceding abstract, Management: Dust and grit requirements) on the use of food oils, on water supply, and especially on winter feeding. Under prevailing conditions partridges, taking what they can get, have too much greens and not enough grain in the winter diet. Regular daily feeding of a grain mixture is urged and formula is recommended. The principal vegetable foods for various seasons are listed; a great majority of them are plants known as weeds in the United States. The leaflet contains sections also on where to feed, feeding during nesting, feeding vs. disease, partridges and water, and dewpan drinking trays.

Propagation: Chachalaca

Healy, James C. Breeding the Mexican chachalaca, Modern Game Breeding and Hunting Club News (J. A. Gardy Printing Co., 28 W. State St., Doylestown, Pa., 25 cents a copy), 7(9), Sept. 1937, pp. 4-5, 2 photos.

Notes on care of birds and a few young that were reared.

Propagation: Fur animals

Ashbrook, Frank G. The breeding of fur animals, U. S. Dept. Agr. Yearbook (Supt. of Documents, Washington, D. C., $2.00 a copy) 1937 (September), pp. 1379-1395, 7 figs.

The 1937 Yearbook, like that for 1936, is largely devoted to genetics. The present title is that of the only contribution to these volumes from the Biological Survey. The author's theses are that research is needed to throw light on the breeding habits and gestation periods of fur animals so that an intelligent conservation program may be based on their biological needs, and that breeding research is needed to give a more certain foundation for the production of fur animals in captivity. The article includes a brief history of the fur industry in the United States and a short statement of the production and demand for furs. The genetical discussion is presented under the following headings: Reproductive cycles, raising fur animals in captivity, production on fox farms, present breeding methods, market requirements, research on inheritance in the fox, genetic relationships between red, cross, and black foxes, and a suggested program for further research.

Propagation: Irradiation results, bobwhite

Bissonnette, Thomas H., and Albert G. Csech. Night lighting with bob-white, Bird-Banding (Chas. B. Floyd, 95 South St., Boston, Mass., 50 cents a copy), 7(4), Oct. 1936, pp. 168-170.

From authors' summary: "Increasing the daily period of exposure to light between December 16th and June 19th up to five hours per night with electric light from a 60-watt bulb induced a pair of Quail to begin to lay fertile hatchable eggs from March 22d onward. Controls began to lay at the usual time on May 19th. x x x This method may be used to obtain early chicks from Quail for restocking depleted game preserves."

Bibliography of 6 titles, all by the same authors.

Propagation: Irradiation results, raccoon

Bissonnette, Thomas H., and Albert G. Csech. Modification of mammalian sexual cycles, VII--Fertile matings of raccoons in December instead of February induced by increasing daily periods of light, Proc. Royal Soc. London, Ser. B. (827), Vol. 122, pp. 246-254, April 1937.

From authors' summary: "By increasing the daily periods of illumination from 10 October onward, three male raccoons were induced to become sexually active in December and to mate with two females each, similarly brought into oestrus in December instead of February.

"Three of the females were successful in rearing young during the previous season, and they again gave the same number of young under the experimental lighting (four, one and three, respectively) as under normal conditions in the previous year, with and without continued lighting after the last 2 weeks of gestation (this, in spite of subzero weather). So lactation and maternal instincts were normal.

x x x

"The breeding season of the raccoon may, therefore, be advanced 40 days by increased daily exposure to light in autumn. Young ones, so produced, were successfully reared through early spring months, grew as well or better than those born at normal dates, and reached maturity of size earlier than usual."

Propagation: Pheasant, care of young

Kellogg, H. B., Jr. Pheasants--their care and treatment, Wisconsin Sportsman (2004 Winnebago St., Madison, Wis., 10 cents a copy), 1(11), July 1937, p. 2, 1 photo.

Suggestions on the prevention of feather, body, and tail picking; regulation of brooder temperatures; signs of disease and what to do; and the importance of green food.

Research: Trapping and ringing technique

Chitty, Dennis. A ringing technique for small mammals, Journ. Animal Ecology (Cambridge University Press, Fetter Lane, London, E.C. 4, England), 6(1), May 1937, pp. 36-53, 5 figs., 9 tables.

A trap for live captures and the rings used for marking the animals are described and illustrated; the bands are like those used in bird study, except that they are of nickel to reduce damage by gnawing; they are put on the hind legs of the animals. Previous studies of small mammal movements are reviewed, and the author's work on the long-tailed field mouse (Apodemus sylvaticus) and the bank vole (Evotomys glareolus), reported. The paper is especially concerned with technique and its modification so that the results obtained shall reflect, so far as possible, normal activities of the mice. Movements of the animals named were recorded up to 480 yards in the case of the field mouse and up to 300 yards in that of the vole. Variations in movements occur seasonally and with the sexes of Apodemus. "In making estimates of animal numbers, differences in activity may be a complicating factor. Determination of the true extent of the home range of each species is likely to be a problem of some magnitude." Bibliography of 12 papers, half of them American.

Wildlife technology and its social significance

Anon. Technology and wildlife, National Resources Committee [report on] Technological Trends and National Policy (Supt. of Documents, Washington, D. C., $1.00 a copy), June 1937, pp. 135-136.

Condensation of the material presented in Leaflet BS-67, "Wildlife Technology," by W. L. McAtee, which was abstracted in WILDLIFE REVIEW, No. 7, Dec. 1936, p. 29.

WILDLIFE RESEARCH AND MANAGEMENT LEAFLET

A single issue of interest to wildlife managers additional to those previously mentioned is listed below. Copies of these mimeographed leaflets can be obtained from the Biological Survey, U. S. Department of Agriculture, Washington, D. C.

BS-94. Status of eelgrass (Zostera marina) on the North Atlantic Coast, by John J. Lynch and Clarence Cottam, July 1937, 15 pp., 1 table.

Review of the decline of eelgrass in 1931 and of the subsequent history of the plant; summary of conditions by States up to date of publication. Report on experimental plantings. [Supplements BS-3, "The present situation regarding eelgrass," abstracted in WILDLIFE REVIEW, No. 1, Sept. 1935, p. 30.]

SPECIAL ARTICLES

Birds feeding on mulberries

Two lists of birds that feed on mulberries (references at the end of article), published years ago, contain the names of species additional to those for which mulberry-eating is known from stomach analysis. The value of field observation in complementing laboratory study of stomachs is obvious and in some cases gives us about all the information we have as to the use of certain food supplies. In the wildlife management field, making observations that will most

valuably supplement recorded information on food habits is an opportunity of field workers that should not be neglected.

Field observations have altered the impression as to the value of mulberries as a "decoy crop," attracting the attention of birds away from cultivated fruits. While under certain circumstances they may have this effect, under others they may be ineffective, or may even favor increased damage. At any rate it has been found in California field investigations that copious food supplies encourage local concentrations of birds near cultivated crops and may be the factor responsible for serious damage.

In the following list of birds (63 species) known to eat mulberries, the initials following the names indicate as authorities: H = Holt, M = Morriam, and BS = Biological Survey.

Wood duck	BS	Eastern bluebird	BS, M
Lesser scaup duck	BS	Cedar waxwing	BS, M
Ruffed grouse	BS	Phainopepla	BS
Bob-white	BS	Starling	BS
Dowitcher	BS	White-eyed vireo	BS
Yellow-billed cuckoo	M	Red-eyed vireo	BS, H, M
Eastern flicker	BS	Warbling vireo	M
Gilded flicker	BS	Yellow warbler	M
Red-bellied woodpecker	BS, H	Cape May warbler	M
Red-headed woodpecker	BS, H	Bay-breasted warbler	M
Hairy woodpecker	BS	Oven-bird	BS
Downy woodpecker	H, M	Yellow-breasted chat	H
Eastern kingbird	BS, H, M	English sparrow	BS, M
Scissor-tailed flycatcher	BS	Baltimore oriole	BS, H, M
Crested flycatcher	BS, H	Orchard oriole	BS, H, M
Eastern phoebe	M	Boat-tailed grackle	BS
Least flycatcher	M	Purple grackle	BS, M
Eastern wood pewee	M	Common cowbird	M
Blue jay	BS, H	Western tanager	BS
White-necked raven	BS	Scarlet tanager	H, M
Common crow	BS	Summer tanager	H
Fish crow	BS	Cardinal	BS, H
Black-capped chickadee	BS	Rose-breasted grosbeak	BS
Carolina chickadee	BS	Black-headed grosbeak	BS
Tufted titmouse	BS	Indigo bunting	H
Mockingbird	BS	Purple finch	M
Catbird	BS, H, M	Common goldfinch	M
Brown thrasher	BS, H	Eastern towhee	BS, H
Robin	BS, M	Chipping sparrow	M
Wood thrush	BS, H. M.	White-throated sparrow	H
Hermit thrush	BS	Song sparrow	BS, M
Olive-backed thrush	BS		

Doubtless the names of numerous species remain to be added.

The references to papers on the subject are:

Holt, Ernest G.
1918. Birds and mulberries, The Auk, 35(3), July, pp. 359-360.
Locality: Prattville, Ala.

Merriam, C. Hart
1891. Birds which feed on mulberries, U. S. Dept. Agr. Rep. 1890, p. 285.
Localities: Westchester County, N. Y., and Department of Agriculture Grounds, Washington, D. C.

Subject heads for a bibliography of mammals, By D. A. Mac Lulich

The following description of a card file of mammalogical references is presented as an example of technique and of classification of references that may be useful to mammalogists and wildlife specialists. This file was developed while the author was studying the varying hare at the Department of Biology of the University of Toronto under the direction of Prof. J. R. Dymond, Director of the Royal Ontario Museum of Zoology. Assistance received from the University and Museum staffs, and particularly from Prof. Dymond, is gratefully acknowledged.

POLICY: The bibliography was primarily an index to literature dealing with mammals that are found in Canada, and secondarily an index to papers on biological principles and their applications that are of interest or use to mammalogists. The intention was to include all locality records of mammals in Canada and also sufficient records from the neighboring states to list all species found near Canadian borders. Foreign records and general notes to be included only as they are of special interest.

CLASSIFICATION OF MAMMALS: Families and larger units are arranged according to "A new classification of mammals," by G. G. Simpson (Bul. Amer. Mus. Nat. Hist., vol. 59, art. 5, pp. 259-293, 1931). Genera and species are arranged alphabetically.

FORM: Cards 3x5 inches; top line, at left, author; at right, year, above the year, subject heading; second line (or lines), title, not specially capitalized; next line, reference in full (for publication, however, it is customary to take only volume number and pages); below the reference an abstract, summary, note or quotation may be given. Guide cards with 5 tab positions are used.

SUBDIVISIONS OF THE FILE: Primarily classified by subject; subdivided where desired by geographic districts and by systematic headings. Within each division the cards are filed alphabetically by authors. General papers and books are listed first under each subject heading, followed by those filable under sub-headings and specific references. Yellow cards are used for the subject headings, blue for the geographic headings, and salmon for the systematic headings. Major subject headings as continents and orders of mammals are on tabs in the first position at the left. The subdivisions use the other four positions--family headings on the second position tabs and species headings on fourth position tabs. Many books and some papers covering a wide field may not be

abstracted in detail, but simply cited in the general sections of the larger subject divisions. Therefore it must be remembered that the references to a particular subject will be found in two places; under the detailed subject (or species) heading and under the general section preceding it. The major subject divisions used are the following:

Periodicals Examined.

Bibliographic References.

General Works on Mammals. See also under Ecology, General, and Taxonomy.

Taxonomy, and Systematic Mammalogy. No geographic headings. Subdivided by order and sub-order, family and sub-family, genera and sub-genera, species, sub-species (the 5 card positions).

Palaeontology of Mammals. Geographic and systematic sub-divisions.

Evolution. Systematic divisions only.

Anatomy. Subject divisions; general, myology, osteology, histology, cytology, biometry (measurements, growth), pelage, tracks, scatology. Systematic headings within each subject as needed.

Embryology. Systematic sub-divisions.

Reproduction, Breeding. Systematic sub-divisions.

Physiology. Systematic sub-divisions.

Genetics. General, hybridization, statistical, heredity of special characters such as pelage. Systematic sub-divisions.

Psychology. General, "intelligence", sociability. Systematic sub-divisions.

Ecology. (1) General; (2) Studies, life histories and general works on groups or species; (3) Relations to environmental factors as light, heat, fire, mortality from automobiles, trains, etc., effects on environment; (4) Habits, actions. Systematic sub-divisions. Sub-heading: territoriality, or home range; (5) Domestication, captivity, conditioning. Systematic sub-divisions; (6) Food. Systematic sub-divisions; (7) Associations, plant and animal; habitats, succession. Systematic sub-divisions; (8) Diseases, parasites, deaths, epidemics. General, followed by some systematic headings, then geographic divisions with systematic sub-divisions. (Note: Taxonomic and other studies on parasites, bacteria, etc., will be found in the auxiliary files of those subjects, apart from the mammalogical bibliography.) (9) Population. General, with some systematic sub-divisions (see Distribution and Abundance for specific local records); Predation, Systematic sub-divisions (classified by prey); Competition, Systematic sub-divisions. (Note: See also auxiliary file of Population

physiology.) (10) Spread, Migration. Systematic sub-divisions; (11) Animal Geography: (a) General followed by some general references under geographic headings; (b) Surveys, Lists. Geographic divisions; (c) Distribution and Abundance, specific records. Geographic divisions and Systematic sub-divisions.

Conservation. General and some systematic sub-divisions.

Management. (1) General: (2) Information, Economic mammalogy. General and systematic sub-divisions; (3) Methods and definite plans for management. General and systematic sub-divisions; (4) Mammal culture, farming, raising. Systematic sub-divisions; (5) Introduction of exotics. Geographic headings with systematic sub-divisions; (6) Administration: (a) Activities of administration as organization of personnel and comparison, reports; (b) Statutes, regulations.

Utilization. (1) General; (2) Hunting; (3) Trapping, general and systematic sub-divisions; (4) Fur trade; (5) Fur industry; (6) Whaling; (7) Technique of preparation of skins.

Technique. Some definite methods of use in management, censuses, osteology, microscopy, etc.

It was desired to keep certain useful references that did not form a part of a mammalogical file. These were kept in the following auxiliary files: 1. Ornithology, 2. Parasitology, 3. Bacteriology, 4. Mycology, 5. Pathology, 6. Biochemical Tests, 7. Plant Ecology, 8. Miscellaneous Ecological Studies, 9. Population Physiology, 10. Miscellaneous Cycles, 11. Mathematics, Statistics.

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Massachusetts wildlife program, By Harold M. Bradbury

Massachusetts has three distinct ecological zones: the eastern or seacoast, the central or Connecticut River valley, and the western or Berkshire Mountain. Each of these calls for different treatment, and any policy drawn to cover this state must be flexible enough to provide for all three.

There are also different conditions to meet on our tide marshes than are found in states lying to the south. Our marshes average 10 feet level and our range in high tides is from 7.1 to a flood tide of 12.1, giving a variation of 5 feet, and our ebb tides run from -2.2 to +1.8. These conditions are entirely dissimilar to those existing in most of our Atlantic seaboard states and consequently call for different treatment in carrying on a waterfowl and shorebird restoration program.

Under Commissioner of Conservation, Ernest J. Dean, there have been set aside 16 wildlife refuges, totaling 9,455 acres, the largest comprising 1,600 acres and the smallest 150 acres. Seven of these have been mapped, work plans for them drawn, and actual development started. On two of these areas, develop-

ment has been uninterrupted since February 1935 and has continued on the others also with the exception of short layoffs due to emergency flood work or lack of funds.

Following our policy for the "Selection, Development, and Maintenance of Wildlife Refuges," under the head of "Fire Prevention" we have constructed or improved 43.7 miles of graveled fire lanes and built 50 waterholes. To supply cover we have planted 247,650 three-year old nursery grown coniferous trees in scattered groups adjacent to feeding grounds and at other advantageous points, and we have piled slash to provide temporary escape cover wherever desirable. 7.3 miles of food strips have been cleared, cultivated, and planted, and 42.75 acres of food patches established. Predator control has been carried on successfully with emphasis being placed on the maintenance of escape cover. Winter foods have been improved by planting, transplanting, grafting, and pruning, involving a total of 20,000 persistent-fruit-bearing shrubs and trees, including 2,839 Malus grafts. A total of 847 acres of woodland has been treated to improve composition, with hardwood-softwood groups as the objective. A main nursery for the propagation of food and cover shrubs and trees has been established, as well as branch nurseries in all wildlife areas where it was deemed expedient.

Census is taken twice each month by the grid line system, our lines being run at 400-foot intervals N. & S., E. & W.; observations are made alternately, N. & S. lines being run on the first and E. & W. on the fifteenth of the month or vice versa. Stream improvement has been carried on by the installation of dams, checks, and deflectors, and by cleaning or installation of gravel for spawning beds at springholes, a total of 2.02 miles of trout stream having been treated. Twenty-five ponds have been created, some allocated to fishing and others to waterfowl restoration. Preferred aquatic plants have been set out in some of these waters, and this type of improvement will be continued.

In our tide-marsh waterfowl and shorebird restoration development, we have coordinated with the Massachusetts State Reclamation Board, our efforts having been directed toward restoring potholes and shallow-water mud flats that had been drained through mosquito-control operations. This work has further restored environment for the killifish that eat mosquito larvae and are in turn consumed by many species of wading and swimming fowl; it has also supplied migratory waterfowl with much needed resting stations.

Summarizing, we find that all species of wildlife are materially increased by these operations. This is particularly noticeable of cottontail rabbits in areas that have been developed for a period of two years or more. Grouse increased slightly (about 10%) despite the recent cyclic decline of this species. Deer resort to the refuges during the open season without reducing the kill, 1936 having been one of our largest years in take of deer. Wild turkeys are doing well, with three broods (hatched from stock liberated prior to August, 1936) under observation at Beartown Wildlife Area, the only place where restocking of this species was attempted. From a total of seven known muskrats on Bog Pond in 1934, the increase required twenty-two lodges last

winter. This was brought about principally by closing to trapping and lowering the pond. Benedict Pond, built in 1934 and planted to giant wild rice and wapato, supported seventy black ducks during the fall of 1936.

Our tide-marsh experiments have led to the discontinuance of drastic and complete drainage by mosquito-control authorities in this state. We have proved that mosquito control and waterfowl-shorebird restoration can be carried on successfully with the same operation. Non-game species have increased tremendously, particularly song and insectivorous birds. Rides or food strips sown to cereals, clovers, and other legumes are very desirable, resulting in the breaking up of the forest density, extension of rimrage or edges, sweetening of the soil, and the creation of dusting sites and food supplies through cultivation.

Census as we take it by grid lines, traversing all types of topography and flora, has proved extremely valuable in ascertaining the preferred seasonal environment of the different species. The grid lines themselves act as breaker strips and runways in what we have found to be a very desirable spacing, namely, 400 feet.

In general the best predator control is obtained by providing escape cover as an integral part of the feeding grounds. There are no bounties except for wildcats. Where we have eliminated red-tail and red-shouldered hawks, the less desirable Cooper's hawk has come in. After observing a red-tail kill a Cooper's hawk immediately after it had been placed in the same pen, the experiment was tried of encouraging the Buteos in the wild.

Composition improvement has materially increased the cottontail and grouse population as well as that of desirable non-game species.

From observations taken and findings arrived at over a two and one-half year period, we feel confident that we are building on a sure foundation, and we intend to continue and expand until those who control privately-owned lands see how beneficial our work has been and join wholeheartedly with the State in a Wildlife Restoration Program. When that day arrives, wildlife will realize that "More Abundant Life" so often spoken of but so seldom enjoyed.

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NOTES AND NEWS

Legislation providing for Federal aid to States in wildlife-restoration projects was passed by the recent Congress and approved by the President, September 2, 1937. It authorizes the Secretary of Agriculture, beginning in the fiscal year 1939, to aid such States as have assented to the provisions of the Act and have passed laws prohibiting use of hunting-license fees except for wildlife conservation, in such wildlife-restoration projects as he approves.

It authorizes an annual appropriation equal to special excise taxes on sportsmen's equipment (estimated at $3,000,000 annually) for apportionments to States for this purpose, and permits the Secretary to use not to exceed 8 percent of such fund for expenses and administration of this Act and the Migratory Bird Conservation Act, and also amounts apportioned to States from such fund but not used, for carrying out the provisions of the Migratory Bird Conservation Act. Submission of an annual report to Congress on the disposition made of money authorized to be appropriated by this Act is required. The Act is an authorization, not an appropriation, and no funds are yet available to carry out its provisions. They must be appropriated annually and it is hoped will be provided so that the program may get under way July 1, 1938. Meanwhile preparations are being made by the Biological Survey and the States.

Protection of Whales. In 1931 there was an international agreement for the conservation and restoration of whales, the treaty being ratified by the Senate of the United States in 1935, and enabling legislation passed in 1936. In June of the present year an international congress was held in London for the purpose of modernizing and improving the previous treaty and the draft signed by representatives of 9 nations was ratified by the Senate on August 5. It will come into force when ratified by a majority of the signatory governments and may be adhered to later by any other interested countries. The treaty protects Grey and Right Whales at all times, forbids the killing of young whales or of females accompanied by young, and also the taking of Blue, Fin, Humpback, and Sperm Whales under certain specified lengths. There are detailed regulations for conduct of the whaling business designed to insure conservation of whales and full utilization of those killed. Observance of the treaty is to be secured by the presence of an official inspector of whaling on each factory ship under the jurisdiction of the contracting governments. Arrangements are suggested for continued study of whaling and adjustment of regulations to the needs of the animals.

A mimeographed leaflet of 10 pages on "Preparing Scientific Manuscripts for the Biological Survey" is available for distribution outside of the Bureau. Several hundred copies were used by the Soil Conservation Service and the National Park Service, and the leaflet can still be obtained by individuals upon application to the Biological Survey.

Land use adjustment programs being carried out in Washington, Oregon, and Idaho will benefit native game and wildlife, according to information from Resettlement Administration (now Farm Security Administration) Region XI.

In Oneida County, Idaho, ideal game conditions for sage hens and prairie chickens particularly are being created by the withdrawal of 133,000 acres of unsuccessful wheat lands from agricultural use, and by restoration of vegetative cover through erosion control, reseeding, and range management. The

program will also extend to some 250,000 acres of adjacent public domain.

In Tillamook, Yamhill, Douglas, Lincoln, and Lane Counties, Oregon, grouse, deer, elk, bear, and other species will profit from the withdrawal of 73,000 acres of land from agricultural use. An additional 1,125,000 acres of public domain are included in the area to be developed.

Grouse, mule deer, bear, and other wildlife will be protected by similar programs in Stevens and Pend Oreille Counties, Washington, where 240,000 acres will be withdrawn from cultivation and restored to forest and forage cover. About 310,000 acres of public domain land will be part of the development area.

Planning for improved game and wildlife is being done in cooperation with the Forest Service and the Bureau of Biological Survey, U. S. Department of Agriculture. (U. S. D. A. Land Policy Circular, Aug. 1937, pp. 3-4.)

The long-continued campaign, sometimes a necessarily militant one, for suppression of the cattle-fever tick, is well known. Its principal implement is the dipping-vat and where domestic stock, only, carried significant infestations, dipping has resulted in the practical eradication of the cattle tick except in a few counties in Texas and six in southern Florida where the ticks are kept going by undippable deer populations. "Last month," so Time (30(12), Sept. 20, 1937, pp. 66, 68) informs us, "Florida decided the deer would have to be killed." "This summer the ticks got so bad in x x x Orange, Osceola, Polk, Charlotte, Hendry, and Collier counties that the Florida State Livestock Sanitary Board scheduled for last week a gigantic deer hunt. Hired hunters were to kill some 1,000 deer in the quarantined area. At this point, the Florida Deer Protective Association promptly protested, pointed out that the State could not control the hunt because no provision had been made for fencing in the quarantined area. The huntsmen also pointed out that such wholesale hunting would be unsportsmanlike. The Association got a restraining order against the State, which last week decided to postpone the hunt indefinitely."

"Transactions of the regional conference of wildlife technicians, February 18-19th, 1937," Ithaca, New York, 83 pp. 1937, mimeographed through the courtesy of the Pennsylvania Game Commission and the New York State Conservation Department.

This report is not abstracted in the regular way as it is not available for extensive distribution. It may be consulted, however, in libraries of institutions engaged to any considerable degree in wildlife investigations. Brief comments on included papers follow.

Work of the Biological Survey in the Northeast, by W. B. Bell, pp. 6-10. A description of the organization and work of the Survey with special emphasis on the Division of Wildlife Research. The handling of transplanting material,

a survey of farm wildlife management, and the effects of silvicultural operations on wildlife are some of the topics treated.

Wildlife program of the National Forests in the northeastern United States, Region 7, by Barry C. Park, pp. 12-16. This paper deals chiefly with hunter expenditures, the game drive counting method, and stream development.

Progress of wildlife management in the Soil Conservation Service, Region I, by Philip F. Allen, pp. 18-21. Maintenance of vegetative cover on the land is the objective; strip-cropping, tree- and shrub-planting, grazing control, cover management, and feeding stations are discussed in their relation to wildlife.

General outline of the wildlife restoration work carried on by the Resettlement Administration, by A. L. Lamson, pp. 23-25. Conditioning land for wildlife before turning it over to the proposed administrative agency is the function of this service. Maintenance of good environment, especially of areas selected as wildlife feeding plots, and planting of deficient environment are sample activities. Cooperative projects relating to deer, rabbits, and woodcock are mentioned.

Development of submarginal land for game in New York State, by Ben O. Bradley, pp. 26-34. Nine areas totalling some 30,000 acres are being developed for wildlife by the Resettlement Administration. Work is based on thorough surveys and includes mixed planting of open land, providing for continuance of the advantages of brushland, and for good distribution of food and cover in woodland. Swales, streams, and ponds receive special treatment. A year's operations are summarized.

Activities of the National Park Service, Wildlife Division, in New York, Pennsylvania, and New Jersey, by Dan P. Beard, pp. 35-37. Federal work on national parks and monuments, and cooperative work on State reservations. Wildlife receives complete protection in 80% of the parks in the 3 States mentioned. Continuous management of sanctuaries to keep them effective. Correlation of human and wildlife occupancy of parks.

Pennsylvania's game administration program, by Leo Luttringer, Jr., p. 38. Reorganization of force, small refuge program, State game farm program, rabbit management, and the educational program are briefly mentioned.

Progress in Massachusetts, by Harold M. Bradbury, pp. 40-42. Composition improvement in hardwood sprout growths apparently brought about immediate increase in the population of cottontails and ruffed grouse. Making holes to new low levels and still allowing surface water to drain off marshes brought back shorebirds and some waterfowl and still maintained mosquito control.

A resume of New York State's game program, by J. Victor Skiff, pp. 43-47. Organization of the work in five branches, game research, management, distribution, and propagation, and game conservation education. Notes on experimental propagation of ruffed grouse, introduction of Reeves' pheasant, restocking of

quail, winter feeding of deer, and other research. Effects of conifer planting on game. Cooperation with some 700 sportsmen's clubs; educational work in schools.

Raising game food plants, by Sherman W. Eddy, pp. 48-49. Local value of various shrubs; collection of seeds and cuttings for transplanting to areas where needed.

A critical analysis of the value of refuges for woodlot game, by F. C. Edminster, pp. 50-54. Practically the same paper as that entitled "An analysis of the value of refuges for cyclic game species," abstracted in WILDLIFE REVIEW, No. 9, July 1937, p. 7.

The farm game program in Pennsylvania, by James N. Morton, pp. 56-62. Long-standing and acuteness of trespass difficulties. Efforts to solve them in Pennsylvania by a system of farm game refuges with surrounding public shooting grounds and by controlled shooting areas on farms, in both cases without direct compensation to farmers. Both of the plans promise to be successful.

Wildlife in relation to forest management, by Samuel N. Spring, pp. 65-69. Need of taking into consideration such basic factors as the soil and its organisms, and the insect population and its effects upon the forest, and of research to gain definite understanding of local diversities that are sometimes quite unexpected. Correlation necessary of the different phases of forest productiveness and of public uses of forests.

Our fur-bearing animals and their proper place in any conservation program, by Harry Van Cleve, pp. 70-72. Need of additional protection for fur animals; refuges recommended; skunks more useful than injurious; improvement in methods of trapping, especially by novices, much needed.

The effectiveness of the bounty system as a predator control measure, by Richard Gerstell, pp. 74-83. Essentially the same material as abstracted under the title "The Pennsylvania system" in WILDLIFE REVIEW, No. 8, April 1937, p. 3.

Courses announced by Texas Agricultural and Mechanical College, where Dr. Walter P. Taylor has recently been made Head of the Department of Wild Game, include Wildlife Conservation and Management, General Mammalogy, Ecology of Animals and Plants, and General Ornithology, for undergraduates; and Advanced Wildlife Studies and Research on Wildlife Problems for graduates.

Virginia Wildlife, the first issue of which appeared in September, is to be published monthly by the Virginia Wildlife Federation (Blacksburg, Va., 25 cents a year). The first number contains interesting comment on the now abandoned system of bounty payments for hawks in Virginia, a wildlife program for public schools, and an article advising license fees for cats.

Among the laws enacted in Wisconsin in 1937 was one providing a penalty for setting "a steel-jawed trap or any trap which might kill or injure birds, on a pole, post, tree stump or any other elevated perch more than three feet above the ground."

The Wisconsin Conservation Department has established a nursery capable of producing millions of seedlings annually. The plants grown are species useful to wildlife and they will be distributed beginning this fall to cooperators throughout the State. The Department has already supplied more than 8 tons of seed corn and buckwheat to encourage feed patch planting.

Those who still visualize British shooting estates as paradises for hunters may profit by the following account from Time (30(8), Aug. 23, 1937, p. 34): "Since it is hard to shoot grouse without encroaching on one of the 800 private highland moors, renting them to individuals and syndicates is a big business. Rent is usually computed on the estimated yield at $5 a brace. A moor will cost from $1,000 to $35,000 for the six-week season. From that point money is spent with great rapidity by hosts and guests on dogs (which cost up to $40 apiece to rent), dozens of beaters ($2 each a day), a loader for each gun ($2.50 a day), shells, servants, tips, food. To bring down one grouse costs between $5 and $10." These things indicate a paradise for millionaires, perhaps, but not for the Americans we hear so much about who must have "free public shooting."

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